1. (Amended) A process for selectively amplifying nucleic acid sequences comprising contacting multiple single stranded non-circular random oligonucleotide primers (P1), one or more amplification target circles (ATCs), a DNA polymerase and multiple deoxynucleoside triphosphates (dNTP), under conditions promoting said contacting, wherein one or more ATCs hybridizes to more than one of said multiple P1 primers, wherein said conditions promote replication of said amplification target circle by extension of the P1 primers to form multiple tandem sequence DNA (TS-DNA) products and wherein said multiple deoxynucleoside triphosphates (dNTP) are selected from the group consisting of dTTP, dCTP, dATP, dGTP, dUTP, a naturally occurring dNTP different from the foregoing, an analog of a dNTP, and a dNTP having a universal base and wherein at least one nucleotide renders the TS-DNA resistant to nuclease activity following incorporation thereinto.

27. (Amended) The process of claim 1 wherein at least one said dNTP is radiolabeled.

29. (Amended) The process of claim 1 wherein said at least one nucleotide is a phosphorothioate nucleotide.

30. (Amended) The process of claim 1 wherein said nuclease activity is due to an endonuclease.

31. (Amended) The process of claim 1 wherein said nuclease activity is due to an exonuclease.

34. (Amended) The process of claim 1 wherein said nuclease activity is due to a contaminating nuclease.

SUB D1 CONT.

35. (Amended) The process of claim 1 wherein said at least one nucleotide is a modified nucleotide.

SUB D1

50. (Amended) The process of claim 49 wherein the 3'-terminal nucleotide of the primer can be removed by 3',5'-exonuclease activity.

SUB D1

56. (Amended) The process of claim 55 wherein said DNA polymerase is selected from the group consisting of DNA polymerases lacking a 3′-5′ exonuclease activity, such as Taq, Tfl, and Tth DNA polymerase, Eukaryotic DNA polymerase alpha, and DNA polymerases that have been modified to eliminate a 3′-5′ exonuclease activity selected from the group consisting of the exo (-) versions of ϕ29 DNA polymerase, Klenow fragment, Vent and Pfu DNA polymerases.

SUB D1

59. (Amended) The process of claims 38 wherein said multiple primers are a mixture of primers sensitive to exonuclease activity and resistant to exonuclease activity.

SUB D1

60. (Amended) The process of claims 38 wherein a linear DNA target is used instead of said ATC.

61. (Amended) The process of claim 56 wherein said DNA polymerase is ϕ29 DNA polymerase.

REMARKS